

A significant range extension for the Magnificent Broodfrog *Pseudophryne covacevichae*, with comments on similarity with *P. major*, and additional data on the distribution of *Uperoleia altissima*

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ABSTRACT

The Magnificent Broodfrog *Pseudophryne covacevichae* Ingram and Corben 1994 is a Vulnerable frog species that was believed to be highly localised in the Ravenshoe region of the southern Atherton Tableland, north Queensland. Here we extend the known range of *P. covacevichae* approximately 160 km south-southeast to the Paluma Range. This represents a significant range extension and we point out the need for surveys in the intervening upland open forests, and genetic analysis of population structure of this threatened species. Additionally, we extend the range of *Uperoleia altissima* Davies *et al.* 1993 south to the Paluma Range, and provide additional information on its distribution and habitat. We also discuss the need for detailed analysis of the relationship between *P. covacevichae* and the phenotypically similar species *P. major* Parker 1940.

Key words: Paluma Range, frog, vulnerable, Queensland, *Pseudophryne major*, *Uperoleia altissima*

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Introduction

The Magnificent Broodfrog *Pseudophryne covacevichae* Ingram and Corben 1994 is a myobatrachid frog known only from scattered sites above 800 m elevation in a highly localised area in the vicinity of Ravenshoe and Herberton, on the southern Atherton Tablelands in north Queensland (Dennis and McDonald 2012; Vanderduys 2012; Anstis 2013; Cogger 2014). Breeding occurs from October to March when males call from seepages and ephemeral creeks in open eucalypt forests following heavy rains (McDonald *et al.* 2000; Anstis 2013). Eggs are deposited terrestrially beneath vegetation or in nests constructed by males, which typically attend the eggs until hatching, when larvae are washed into pools to complete an aquatic tadpole stage (McDonald *et al.* 2000; Anstis 2013). Because of its localised and fragmented distribution, the species is classified as *Vulnerable* under both the Queensland *Nature Conservation Act 1994* and the Federal *Environment Protection and Biodiversity Conservation Act 1999*, and as *Endangered* by the IUCN (Dennis and McDonald 2012).

Observations

On 9th February 2013, a male *Pseudophryne* was heard calling in dry sclerophyll forest on the western slopes of Mt Spec, Paluma Range (19.010°S, 146.099°E), at approximately 860 m elevation. The frog was found calling from a depression in accumulated leaf-litter adjacent to a small, ephemeral stream (Fig. 1). On 20 February 2013 the site was revisited and several dozen males were heard

calling from the stream banks and a nearby seepage area. Two male *Pseudophryne* were located and observed and both were found attending eggs in shallow burrows (Fig. 2). Males were still calling on the 12 April 2013. The frogs were identified as *P. covacevichae* based on the red, orange, or rufous brown dorsal colouration that forms a connected cap and vertebral stripe, terminating in a yellow line that inserts into a yellow cloacal patch (Figs. 2 and 3) (Ingram and Corben 1994; McDonald *et al.* 2000; Anstis 2013). The call was also consistent with *P. covacevichae*; however,



Figure 1. Habitat for *Pseudophryne covacevichae* and *Uperoleia altissima* near an ephemeral stream on the western slopes of Mt Spec, Paluma Range. The arrow indicates the location of the *P. covacevichae* and eggs pictured in Fig. 2.



Figure 2. Male *Pseudophryne covacevichae* attending eggs in a shallow burrow in leaf-litter.



Figure 3. Male *Pseudophryne covacevichae* from the Paluma Range.

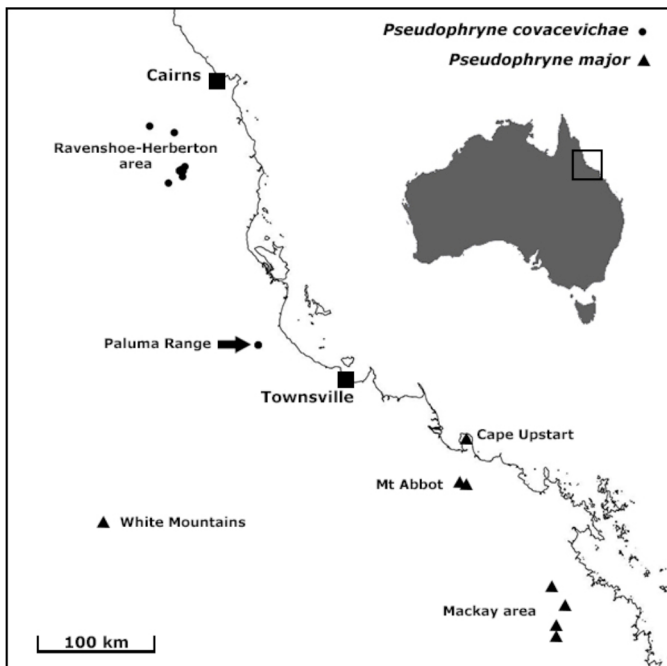


Figure 4. Known localities for *Pseudophryne covacevichae* (black circles) and *Pseudophryne major* (black triangles) in north-eastern Queensland. These records are a combination of our own data and those acquired from Atlas of Living Australia.

the calls of this species and *P. major* are similar (see below).

Another upland Wet Tropics frog, *Uperoleia altissima* Davies *et al.* 1993, was observed at the same site as *P. covacevichae* and at a number of nearby dry forest sites between 500–860 m elevation (Figs. 5A and 6). Genetic analysis has confirmed the identification of these frogs as *U. altissima* (R. Catullo pers. comm. 2014, ANU). In recent years we have also recorded *U. altissima* from relatively low elevation (170–300 m) sandstone habitats in the Laura and Hopevale regions (Fig. 5B and 6), where we have observed the species in seepage areas on sandy soils amongst sandstone escarpment.

Significance of findings

These records extend the known distribution of *P. covacevichae* 160 km south-southeast and represent the first record of any *Pseudophryne* from the Paluma Range (Fig. 4). To date the species has been found only at a single locality in the uplands: a small, ephemeral creek and a nearby seepage area in tall sclerophyll forest with a grassy understory. This habitat type is extensive in the Paluma Range, suggesting that *P. covacevichae* is possibly more widespread in the area. Further, there are extensive areas of upland sclerophyll forest with a grassy understory between the Paluma Range and the Ravenshoe area (e.g., Seaview Range, Kirrama Range, Koombooloomba Dam area) and these need to be surveyed thoroughly for *P. covacevichae* following summer rains. Given the disjunct distribution of *P. covacevichae* on a fine scale (5 disjunct populations are recognised in the Ravenshoe–Herberton area (Dennis and McDonald 2012)) and now more broadly, genetic analysis of population structure would provide important data for management of this threatened species.

We have also extended the known range of *Uperoleia altissima* 105 km south-east. This species is usually cited as not occurring south of the Atherton Tableland (e.g., Anstis 2013), but several records exist from further south in the Herbert River area (Atlas of Living Australia), and here we report them as far south as the Paluma Range. Over recent years the species has also been found by ourselves and others north of the Wet Tropics, in the Laura (e.g., 15.7803°S, 144.2734°E) and Hopevale areas (e.g., 15.3009°S, 145.003°E). In the Wet Tropics, *U. altissima* is found in open forests at elevations above 500 m, where they breed in seepages, small creeks, low-lying areas prone to flooding, and other wetland habitats. In contrast, the individuals that we have observed in the Laura and Hopevale areas have been at relatively low elevations (170–300 m) in seepage areas around sandstone outcrops. While significant, these range extensions are less interesting than for *P. covacevichae* because the species is more widespread and is not listed as threatened.

Neither *P. covacevichae* nor *U. altissima* have been previously detected in the Paluma Range. The Paluma sites are near an all-weather road that is easily accessible and frequently used by wildlife enthusiasts. However, the rainforests at Paluma have attracted a lot more survey attention than the sclerophyll forests on the west of the range. Additionally, *P. covacevichae* has specific habitat requirements, making it highly localised, and appears to



Figure 5. Male *Uperoleia altissima* from the Paluma Range (A) and the Laura area (B).

call only when conditions are suitable. Therefore, it is easily missed if surveys are not conducted at the right place and at the right time. *Uperoleia altissima* is more conspicuous and widespread than *P. covacevichae*, but is morphologically similar, and somewhat acoustically similar, to two other species, *U. mimula* and *U. lithomoda*, and could have been previously misidentified as these.

Taxonomic notes

Pseudophryne covacevichae was described from the similar species *P. major* Parker 1940 based on colouration (brighter than *P. major*) and breeding season (summer vs winter) (Ingram and Corben 1994). The Paluma individuals are generally brightly coloured and were calling in summer. However, with more knowledge now available than at the time of description, it is worth considering these differences. Some individuals of *P. major* approach the brilliant colouration of *P. covacevichae* (e.g., see photos of *P. major* in Vanderduys 2012 and Anstis 2013). The supposed

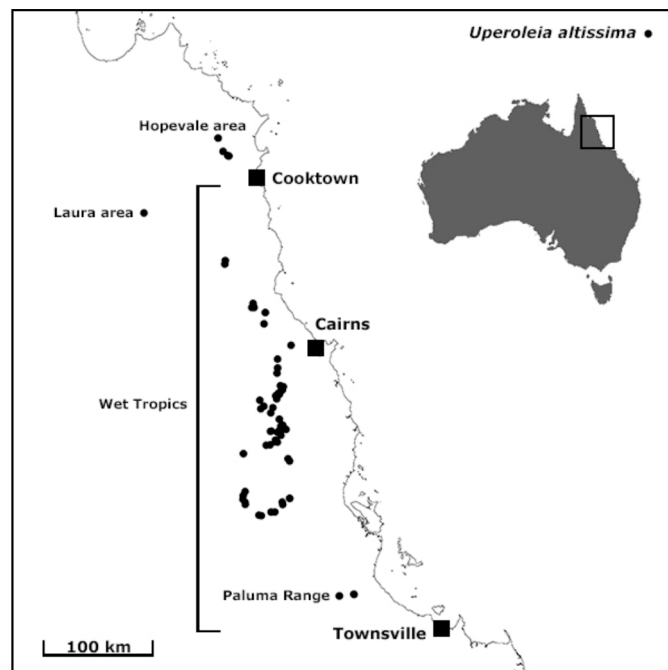


Figure 6. Known localities for *Uperoleia altissima* (black circles). These records are a combination of our own data and those acquired from Atlas of Living Australia.

difference in breeding season is also not diagnostic. While it may hold in some parts of its range that *P. major* typically breeds in autumn and winter, we have recorded it breeding in summer at several localities (e.g., Blackdown Tableland, Mt Abbot). In particular, rainfall in northern parts of the range of *P. major* (i.e., mid-east and central-east Queensland) falls largely in the summer wet season, and breeding opportunities would be rare in the winter dry season. Further, the ranges of the two species are not as geographically separate as once thought: *Pseudophryne major* is now known to occur fairly continuously up the Queensland coast to about Mackay and then as several disjunct upland populations to the north (including Cape Upstart and Mt Abbot, CJH unpub. data) and to the north-west in the White Mountains area (Kutt *et al.* 2005). With *P. covacevichae* records from Paluma, the known gap to the northern isolates of *P. major* is now reduced to approximately 180 km; not dissimilar to the gap between northern isolates of *P. major* or between the Paluma and Ravenshoe populations of *P. covacevichae* (Fig. 4). The calls of the two species are considered indistinguishable (Ingram and Corben 1994); however, a detailed analysis has never been performed. Additionally, phylogenetic analysis of *P. covacevichae* will be important in resolving the status of *P. covacevichae*. For both calls and genetics, inclusion of the northern isolates of *P. major* is essential. Regardless of the taxonomic status of *P. covacevichae*, the isolated north Queensland *Pseudophryne* populations are significant management units.

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